

Notice of Allowability

Application No.

09/800,751

Applicant(s)

MOSSMAN, ALEXANDER
DOUGLAS

Examiner

Mark Ruthkosky

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/27/2004.
2. ☒ The allowed claim(s) is/are 22-37.
3. ☒ The drawings filed on 19 April 2004 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

Mark Ruthkosky
10/18/04

DETAILED ACTION

Claim Rejections - 35 USC § 102

The rejection of claim 38 under 35 U.S.C. 102(e) as being anticipated by Voss et al. (US 6,106,964) has been overcome by the applicant's amendment canceling claim 38.

Allowable Subject Matter

Claims 22-37 are allowed.

The following is an examiner's statement of reasons for allowance:

The instant claims are to a solid polymer fuel cell system comprising a solid polymer fuel cell and an apparatus for humidifying a reactant gas supply stream, said fuel cell having a reactant gas inlet port and a reactant gas exhaust port, said humidifying apparatus comprising a membrane exchange humidifier comprising: (a) a supply stream chamber having an inlet and an outlet with the inlet having a reactant gas fluidly connected thereto and the outlet fluidly connected to the fuel cell reactant gas inlet port; (b) an exhaust stream chamber having an inlet and outlet, with the inlet fluidly connected to the fuel cell reactant gas exhaust port; and (c) a water permeable membrane separating the supply stream chamber and the exhaust stream chamber, whereby water is transferred across the water permeable membrane from the reactant gas exhaust stream to the reactant gas supply stream. The membrane comprises a microporous polymer and a hydrophilic additive. When dry, the membrane is substantially permeable to at least one component of at least one of the reactant gas supply and exhaust streams. The prior art does not teach a solid polymer fuel cell system comprising a solid polymer fuel cell and an

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apparatus for humidifying a reactant gas supply stream wherein the apparatus includes a water permeable membrane comprising a microporous polymer and a hydrophilic additive separating a supply stream chamber and an exhaust stream chamber, whereby water is transferred across the membrane from the reactant gas exhaust to the reactant gas supply stream such that the membrane is substantially permeable, when dry, to at least one component of at least one of the reactant gas supply and exhaust streams.

The most pertinent art is noted. Voss et al. (US 6,106,964) teaches an assembly where water vapor from a fuel cell exhaust is used to humidify a reactant gas supply stream that is on the opposite side of a water permeable membrane (see fig. 1, col. 9, and col. 13, lines 1-15.) The stream to be humidified may be an oxidant or fuel stream (see col. 4, lines 29-47.) The membrane is made of cellulose or perfluorosulfonic acid. These membranes are microporous membranes as well described in the art. The water is transferred across the membrane by a partial pressure difference (see col. 7, lines 32-45.) The relationships between dew points and temperature are taught in cols. 14-16. The humidifier configuration of the reference (figures 1-6, col. 11-12) is the same as in the instant figures. Plates, frames, manifolds, seals, ridges and depressions are noted (in Figure 5 and column 11.) Bundle constructions are noted in col. 12, lines 20-65. The Voss reference does not teach the addition of a hydrophilic additive to the water permeable membrane. Further, the Voss reference teaches that the membranes are impermeable to gasses when dry (see col. 9, lines 45-60.) This is further shown in the instant application on page 33, (Table 2.)

Debe (US 5,910,378) teaches a porous polymer membrane film as a backing layer for a membrane electrode/electrolyte assembly. The membrane may be high-density polyethylene

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with an additive (col. 8, lines 45-60.) The material transfers water vapor across the assembly to allow for continued humidification of the electrolyte assembly (col. 3, lines 28-44 and col. 6, lines 44-end.) The pore sizes of the membrane are between about 0.01 and 10 μm (col. 6, lines 44-col. 7, line 15.) Porosity may be greater than 50% (col. 16, lines 18-33.) Fillers, including silica, may be added (col. 7.) The reference does not teach the material to be used in a solid polymer fuel cell with an apparatus for humidifying a reactant gas supply stream. As the prior art does not teach a solid polymer fuel cell system comprising a solid polymer fuel cell and an apparatus for humidifying a reactant gas supply stream, as claimed, the claims are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from

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either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mark Ruthkosky

Primary Patent Examiner

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Mark Ruthkosky
10/18/04